

REMARKS

Applicants respectfully request reconsideration and allowance in view of the foregoing amendments and following remarks. Claims 2-5, 7, 8, 10, 12-15, 17, 18, 20, 22-25, and 27, 28, and 30 are pending in this case, all of which stand rejected as a result of the November 26, 2007 Office Action. In particular, all of the pending claims have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,487,249 to Kim, et al. ("Kim"), in view of U.S. Patent No. 6,529,634 to Thyagarajan, et al. ("Thyagarajan") and U.S. Patent No. 5,781,241 to Donovan ("Donovan"). Following entry of the amendment, claims 8, 18, 27, and 28 will have been amended, and claims 9, 19, and 29 will have been canceled.

For at least the following reasons, applicants submit that the claims, as amended, patentably define over Kim, Thyagarajan, and Donovan, both individually and in combination. Applicants thus request reconsideration of the rejection, in view of the amendments and remarks herein.

Unavailability of the Thyagarajan Reference

35 U.S.C. § 103(c) makes Thyagarajan unavailable for use in an obviousness rejection in this case. The assignee of both the present case and the Thyagarajan patent is Qualcomm, Incorporated. According to the USPTO assignment database, an assignment of the Thyagarajan patent to Qualcomm was executed on March 3, 2000 (reel/frame 010644/0062), and an assignment of the present case to Qualcomm was executed on June 5, 2001 (reel/frame 011888/0958). The application for the Thyagarajan patent was filed on November 8, 1999, and the patent did not issue until March 3, 2003. The present case was filed on June 5, 2001. Thus, Thyagarajan is unavailable as a reference under 35 U.S.C. § 102(b), and applicants assume that the Examiner intends to qualify Thyagarajan under 35 U.S.C. § 102(e).

Pursuant to MPEP 706(I)(2)(II), applicants' counsel states that the subject matter of the present application (U.S. Patent App No.09/875,329) and Thyagarajan (U.S. Patent No. 6,529,634) were, at the time the invention of the present application was made, owned by Qualcomm Incorporated.

For these reasons, 35 U.S.C. § 103(c) makes Thyagarajan unavailable for an obviousness rejection. Since the rejection of all pending claims is based on a combination of Thyagarajan

with other references, applicants respectfully request that the section 103(a) obviousness rejection of the claims be withdrawn.

However, even if the Examiner maintains that the Thyagarajan reference is available, applicants respectfully submit that the claims, as amended, patentably define over the applied references for the reasons set forth below.

Independent Claims 8, 18, and 28

Independent claims 8, 18, and 28 have each been amended to recite (a) that the blocks have two or more rows and two or more columns, and (b) that filtering is performed vertically (using data from the preceding and subsequent adjacent rows) as well as horizontally (using data from the preceding and subsequent adjacent columns). The Examiner argues that the references, together, show filtering of scan lines combined with decimation, and further asserts that a scan line is essentially a block of dimension $1 \times n$. Even assuming this argument is correct (a point in which applicants do not acquiesce), the references do not, either individually or in combination, show the filtering and decimation with respect to blocks having two or more columns and two or more rows, and also do not show filtering across both rows and columns in the manner recited in the amended independent claims. Moreover, the applied references teach away from the particular technique defined in the independent claims, and thus cannot be combined to support a finding of obviousness.

The Examiner asserts that Donovan “discloses that a filter weighting of current columns of blocks where the 25%-50%-25% configuration is known (Donovan; column 9, lines 30-65; mode of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{4}$) in order to allow for scaling (decimation) between different scan line formats.” (*Office Action dated 11/26/07, page 7.*) As applicants pointed out in their May 30, 2007 response to the prior office action, Donovan modifies coefficients on a line-by-line basis, in contrast to the independent claims’ block-by-block approach. (*Applicants’ arguments dated 5/30/07, page 9.*) The Examiner’s response to this point is that “[t]he blocks [in the claims] are never stipulated in terms of dimension A line reads on the ... case where, each line would be a row ($n=1$) and the columns being equal in number to the number of pixels in each row.” (*Office Action dated 11/26/07, page 5.*) Moreover, the Examiner asserts that, even if the claims established a dimension of the block, this would amount to a mere “duplication” of Donovan’s line operation

(*Office Action dated 11/26/07, page 5.*) In other words, the Examiner asserts that a line is just a special case of a block, and that a multi-line block can be filtered by “duplication” of a single-line filter.

The question of whether the term “block” includes a $1 \times n$ line is rendered moot by the claim amendments, and thus applicants do not address that point. The independent claims, as amended, define a block that is at least two rows and at least two columns in size. Therefore, this block, as presently defined, does not read on Donovan’s scan lines. Moreover, the independent claims, as amended, define filtering that is performed both horizontally across adjacent columns (using columns $m-1$, m , and $m+1$), as well as vertically across adjacent rows (using rows $n-1$, n , and $n+1$). This technique, clearly, reflects the structural difference between filtering a $1 \times n$ line and filtering an $m \times n$ block (with $m, n \geq 2$). Using data from plural adjacent rows is not possible when filtering a $1 \times n$ line, since such a line has only one row. Moreover, filtering across both rows and across columns causes the final value of an element to receive contributions from adjacent pixels in both the horizontal and vertical directions (as shown, by way of example and not limitation, in FIG. 4C of the present application). This is not possible with a line filter, since a line extends in only one dimension. Thus, filtering a block by considering neighboring values in both the horizontal and vertical directions is not the same as mere “duplication” of a line-filtering technique. While Donovan shows tables of coefficients (such as $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{1}{4}$) that may be used for filtering, Donovan does not show that filtering with these coefficients is done over a block in both the horizontal and vertical directions.

Independent claim 8, as amended, defines:

filtering each element of each column of each block,
wherein for a given m^{th} column, weighting column $m-1$ 25%,
weighting column m 50%, and weighting column $m+1$ 25%;

filtering each element of each row of the block, where
given an n^{th} row, filtering further comprises weighting row $n-1$
25%, weighting row n 50%, and weighting row $n+1$ 25%; and

Independent claims 18 and 28 define similar features. As can be seen, these features take into account the $m-1$, m , and $m+1$ columns of a block, and also the $n-1$, n , and $n+1$ rows of the block. Considering adjacent elements in both directions would not be possible in the line-based

algorithm of Donovan, since at least one dimension of a line has only one pixel and, therefore, no adjacent (+1 and -1) elements to consider.

Donovan mentions that scaling (e.g., resizing) of an image can be done in the horizontal or vertical directions. However, there is no teaching or suggestion in Donovan that filtering would be done across both rows and columns in a given block. Thus, Donovan does not teach the two filtering features of independent claims 8, 18, and 28.

Applicants note that the row-based filtering in the amended independent claims originated in dependent claims 9, 19, and 29 (with a minor correction for a typographical error, as noted below). The Examiner rejected claims 9, 19, and 29 by applying the same portion of Donovan (column 9, lines 30-65) as was applied to the filtering limitation in the prior versions of independent claims 8, 18, and 28. As explained above, the applied portion of Donovan does not teach or suggest filtering across both rows and columns in a given block.

Additionally, the filtering features of the independent claims are not taught or suggested by Kim or Thyagarajan.

Filtering is not taught, or even mentioned, by Thyagarajan. (A word search of that published application shows that neither the word “filter”, nor any variant thereof, appears in the reference.) Moreover, the Examiner acknowledges that Thyagarajan “fails to disclose having [sic] filtering each element of each column of the block, where given a column, weighting the previous column 25%, the current column 50%, and the next column 25%.” (*Office action dated 11/26/2007, p. 7.*) Furthermore, as explained in applicants’ May 30, 2007 response to the prior Office Action, Thyagarajan addresses primarily block size assignment (BSA). Performing filtering on a block is necessarily something that happens after the size of the block has already been assigned. Thus, Thyagarajan’s pre-BSA technique (which does not mention filtering at all) does not render the filtering features of the independent claims obvious.

Finally, Kim does not teach, suggest, or otherwise render obvious the filtering features of the independent claims, since Kim teaches away from these features. Specifically, Kim teaches using values other than the previous (-1) and subsequent (+1) lines when filtering near a boundary. Kim observes the problem that occurs when filtering near the boundary of the block, since the elements adjacent to the boundary are not known:

... if the filter is simply applied to a block of spatial pixel values,
there is a transition of filtering on the block boundary which is

caused by an insufficient number spatial pixel values beyond the boundary to fill the residual of the filter. That is to say, the edge of a block cannot be properly filtered because the N-tap filter has respective input pixels for only $N/2$ or for $(N/2)-1$ taps depending upon whether N is even or odd. The remaining input pixels are beyond the boundary of the block. Several methods of supplying pixel values exist: 1) repeat a predetermined constant pixel value beyond a boundary; 2) repeat the same pixel value as the boundary pixel value; and 3) mirror the pixel values of the block to form previous and subsequent blocks of pixel values adjacent to the processed block.

[Kim, col. 11, lines 1-15.]

In other words, Kim teaches that, near the boundary of a block, the input to the filter should be either a predetermined value, the boundary value, or a “mirror” value. These values are *not* the $m+1$ or $m-1$ (or $n+1$ or $n-1$) values described in the claims. Moreover, Kim teaches away from using the $+1$ or -1 values defined in the claims, since Kim states there are an “insufficient number” of such values near the block boundaries.

The independent claims, as amended, call for filtering “each element of each column” and “each element of each row” in a block using the $+1$ and -1 values. Kim states that elements near the boundaries are filtered using values that are not the $+1$ and -1 values, and thus does not teach or suggest the feature of filtering “each element” using the $m+1$, $n+1$, $m-1$ and $n-1$ values, as in the independent claims. References that teach away from their combination cannot be combined in an obviousness rejection. MPEP 2145(X)(D)(2). Thus, a combination of references based on Kim does not show obviousness of the independent claims.

Accordingly, neither Kim, Thyagarajan, or Donovan – either alone or in – teaches or suggests the independent claims’ features of filtering a block across both plural rows and plural columns. Thus, applicants request that the section 103(a) rejection of these claims be withdrawn in view of the amendments and these remarks.

Dependent Claims 2-5, 10, 12-15, 20, 22-25, and 30

Dependent claims 2-5, 10, 12-15, 20, 22-25, and 30 depend, either directly or indirectly, from independent claims 8, 18, and 28. Since claims 8, 18, and 28, as amended, have been shown to be define over the applied art, the dependent claims define over the applied art at least by

reason of their dependency. Accordingly, the section 103(a) rejection of the dependent claims should be withdrawn.

No New Matter – Support for Claim Amendments

The amendments to claims 8, 18, 27, and 28 do not introduce new matter.

The amendment to claim 27 corrects a typographical oversight.

The amendments to claims 8, 18, and 28 that define the numbers of columns and rows, m and n , as each being “two or more” are supported at least by paragraphs 0036, 0042, and 0053, which show blocks of varying sizes $m \times n$, with m and n greater than two.

Additionally, claims 8, 18, and 28 have each been amended to incorporate their respective dependent claims, 9, 19, and 29. Thus, these amendments are supported by original claims 9, 19, and 29. Claims 9, 19, and 29 each originally referred to the “ n^{th} column”. In the amendment, this language has been changed to “ n^{th} row”. Since these claims (and the independent claims on which they are based) refer to the n value as a “row”, this change merely makes the language consistent throughout the claim and does not introduce new matter.

CONCLUSION

For the foregoing reasons, applicants request that the section 103(a) rejection be reconsidered and withdrawn in view of the amendments and remarks herein. Applicants submit that this case is now in condition for allowance.

Respectfully submitted,

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